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AUTHOR Merritt, John E.
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ABSTRACT

Whether we can and do recall information on appropriate occasions depends upon how we learn it, how we retain it, and how we need to retrieve it. Efficient learning depends to a large extent upon motivation to learn the organization of the material and, with certain qualifications, upon the amount of repetition. Memory of material read is enhanced when the learner utilizes structures inherent in the text and his own subjective schema, cognitive maps, and knowledge structures. Periodic review assures retention of information, and cultivation and utilization of "prompts" aid in its recall. The immediate means for studying problems of information storage and retrieval is the resource unit, but the concept of such a unit needs to be developed in terms of the individual student's information needs. It can go far toward preparing a student to meet unpredictable eventualities by causing him systematically to check his facts, modify his ideas, re-examine periodically his most basic frames of reference, and examine the relationship of all his ideas and his conceptual framework. (Author/RD)

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John E. Merritt
Professor of Educational Studies
The Open University,
Walton Hall,
Walton,
Bletchley,
Buckinghamshire,
England.

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THE INDIVIDUAL STUDENT RESOURCE UNIT,

READING AND THE CURRICULUM

to be presented at

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1. In reading for information our needs are often of a relatively transient kind. We look in our newspapers in order to find out what is on television tonight, we consult a specialised magazine in order to find out something about a carpet, a car, or a camera which we are thinking of buying next week, or we may, perhaps consult a geography text book in order to get relevant information about some are in which we are proposing to live. This paper, however, is primarily concerned with the information which we may want to remember for longer periods.

The important point about reading for information to satisfy long term purposes is that the information is only worth learning if it can later be recalled in a variety of appropriate contexts. And whether or not we can and do recall information on appropriate occasions depends first on how we learn it, second on how we retain it, and third on how we need to retrieve it.

2. Let us concentrate for a moment on the first of these - how we learn through reading in the first place.

Efficient learning depends to a very large extent on motivation to learn the organisation of the material to be learned, and, with certain qualifications, the amount of repetition.

2.1. Motivation to learn through reading is not likely to be achieved, or maintained, if students are simply required to plough their way through a selection of prescribed text books. Increasingly,

therefore, motivation is encouraged by helping students to establish their own purposes for reading and to satisfy their reading needs by accessing a variety of books. If they do access a variety of books it will commonly be the case that a certain amount of note-taking will be necessary. The information so gathered will then need to be collated in some way ready for use. As we are concerned with long term information needs, the material the student has prepared must obviously be stored in some form. If it is to be stored then some attention must be given to the question of when and how it is to be retrieved. But the problem of efficient storage and retrieval of information is now achieving critical proportions in government and in business, as well as in professional and in academic life. The study of such problems, I suggest, may be seen to have a legitimate origin within any curriculum that seeks to foster independent enquiry as an important educational goal.

This study, I will argue, must be regarded as a major component in any up to date curriculum. Fortunately, the immediate means for studying problems of information storage and retrieval is ready to hand - the resource unit. This term refers to all the information which people store in terms of some unified conceptual system, the physical structures which are used for this purpose, the referencing system which they use to facilitate retrieval, and the physical structure of that retrieval system.

But the concept of the resource unit needs now to be systematically developed in terms of the information needs of the individual student and not restricted to the class resource unit, the school resource control, or the more distant resource complexes of the

supporting educational system. And as the information to be stored is so massively dependent on reading then the problem of storing that information for subsequent retrieval is evidently one aspect of the reading problem, namely, reading in order to satisfy long term information needs.

2.2. Let us now consider another aspect of learning - that of organising the material to be learned. The importance of structuring learning experiences has been well documented during the last four decades and needs no elaboration here. We may note, in fact, that recognition of the practical value of structure as an aid to memory goes back to the Greeks of ancient times.

2.2.1 But if the problem of structure is so important we must try to decide what kinds of structure are most important for what kinds of purpose.

Let us therefore distinguish two kinds of structures that concern us in reading. First, there are the structures provided by the author. Second, there are the subjective schema, cognitive maps, or knowledge structures of the reader.

The author's structures, that is the structures inherent in the text, can be analysed in a number of ways. For the sake of simplicity let us simply note that there is an obvious set of linear structures and a less obvious conceptual structure. The linear

structures may take the form of time sequences, process sequences, cause-effect sequences and so on. Over and above this, however, is the organising conceptual structure, a set of relationships between these linear sequences that may not have any close relationship to the linear sequences in the text. These relationships may be presented in a simple, logical order, but, at the other extreme, they may be presented so haphazardly that the text is hard to follow and the organising structure difficult to identify.

Trying to perceive an author's conceptual structure in a written text is, in some ways, like trying to perceive a painting by following the sequence of the artist's brush marks on the canvas. With a painting, however, it is always possible, at the end, literally to stand back and see the canvas as a unified whole. With print this is impossible. We can only perceive the whole directly if we take the trouble to draw up a representation of the text by means of some sort of diagram or flow-chart. And, of course, we must not necessarily think in terms of a text having a single, coherent, organising structure. The extent to which we can tease out and identify what structure there is, however, is of critical importance to our comprehension at the interpretive level. A map is provided with this paper to help you to identify the structures embodied in this presentation.

If we can respond to structures inherent in the text we are obviously in a better learning posture that if we try to learn a series of unorganised elements. If we are reading for our own

purposes, however, then, as we saw earlier, we shall very often be accessing more than one text in order to extract what seems valuable for any given single purpose. This means that the information gained through reading must be synthesised.

Such a synthesis calls for a structuring that is unlikely to be self-evident in the material and one which may not be the same as any single structure previously in the mind of the reader. In this case, the storage categories developed for the resource unit up to that point will not serve either - for they are merely a limited representation of the student's developing cognitive map. Re-designing the resource unit categories, therefore, goes hand in hand with the more complex reorganisation of the reader's internal map. But so many possibilities must be explored in order to arrive at a workable solution that the re-design of the resource unit must inevitably stimulate a much more exciting growth in the knowledge structure of the reader.

Reading for information, then, must be seen as a process which includes the storage of information in an ever expanding - and ever more efficient - cognitive structure. Reading, in other words, is a major contribution to cognitive growth. The development of a student's personal resource unit provides us with a valuable diagnostic index of that growth as well as a positive stimulus to growth. The development of the student's individual resource unit must, therefore be regarded as a major responsibility and concern for the teacher of reading.

Before we leave the question of organisation as a factor in learning, and hence in reading for information, let us consider two further points.

2.2.2 The better organised the student's cognitive map the better able he is to label specific details in what he reads and locate them in various appropriate cognitive sub-structures. This is similar to using the retrieval system in his resource unit. We may reasonably suppose that an increased efficiency in cross-referencing items in the retrieval system will be accompanied by a greater increase in the relationships mapped in the student's subjective schema. To the extent that the student is helped to develop in this way, then to that extent he is less dependent upon inadequacies of presentation in the material that he reads. If he can locate information directly in terms of his own subjective system he is also less likely to forget them, as the burden on short term memory is greatly reduced.

2.2.3 The other point about organisation and structure is that they depend upon an ability to develop higher order category systems so that a wealth of information can be represented by simple expressions - such as "$e = mc^2$". The resource unit categories are of this kind and their progressive development provides a massive vehicle for the accumulation of learning.

2.3. Before we move from learning to retention there is a third point that was introduced initially in a qualified way on the role of repetition. The qualifications about repetition in relation to learning need not concern us here. From the point of view of the resource unit concept, however, the opportunities for repetition

are legion. If the information serves some genuine purpose of the student, and is not merely some inconsequential irrelevance foisted on the student by the teacher, then it will be accessed frequently whilst it is still 'live'. It will achieve, in other words, the amount of repetition it deserves - and thus it will be learned as well as it deserves!

3. This takes us to a related point concerning the second critical
3.1. aspect of reading for information - retention. Even once we have
3.1.1 learned something well, how can we be sure it will be retained
3.1.2 over a long period? Periodic review is the critical element here, and this is precisely what the resource unit provides. As the student pursues his studies in increasing depth, so he can review and revise his previous ideas by comparing his resource unit material with his later findings. So, too, he reviews and updates his resource unit, andlearns to maintain a personal filing system with maximum economy - a skill he will need increasingly in his personal life as much as he may need it in his work.

4. Finally, our reading for information must provide the ultimate 'pay-off' - we must be able to recall information in any situation in which such recall would be of value to us.

4.1. Let us tie our ideas here to the concept of the 'prompt'. An initial letter may prompt a small child to recognise a whole word; a newspaper statement that a brickworks is to be built in a nearby field may prompt an older student to remember reading in science that the fumes given off in the production process are pretty

poisonous and that he read a leaflet about a society for the environment asking for support some time ago, and so on. Can the resource unit help the student to respond more competently to this multiplicity of relevent 'prompts' to which he will be exposed over the years?

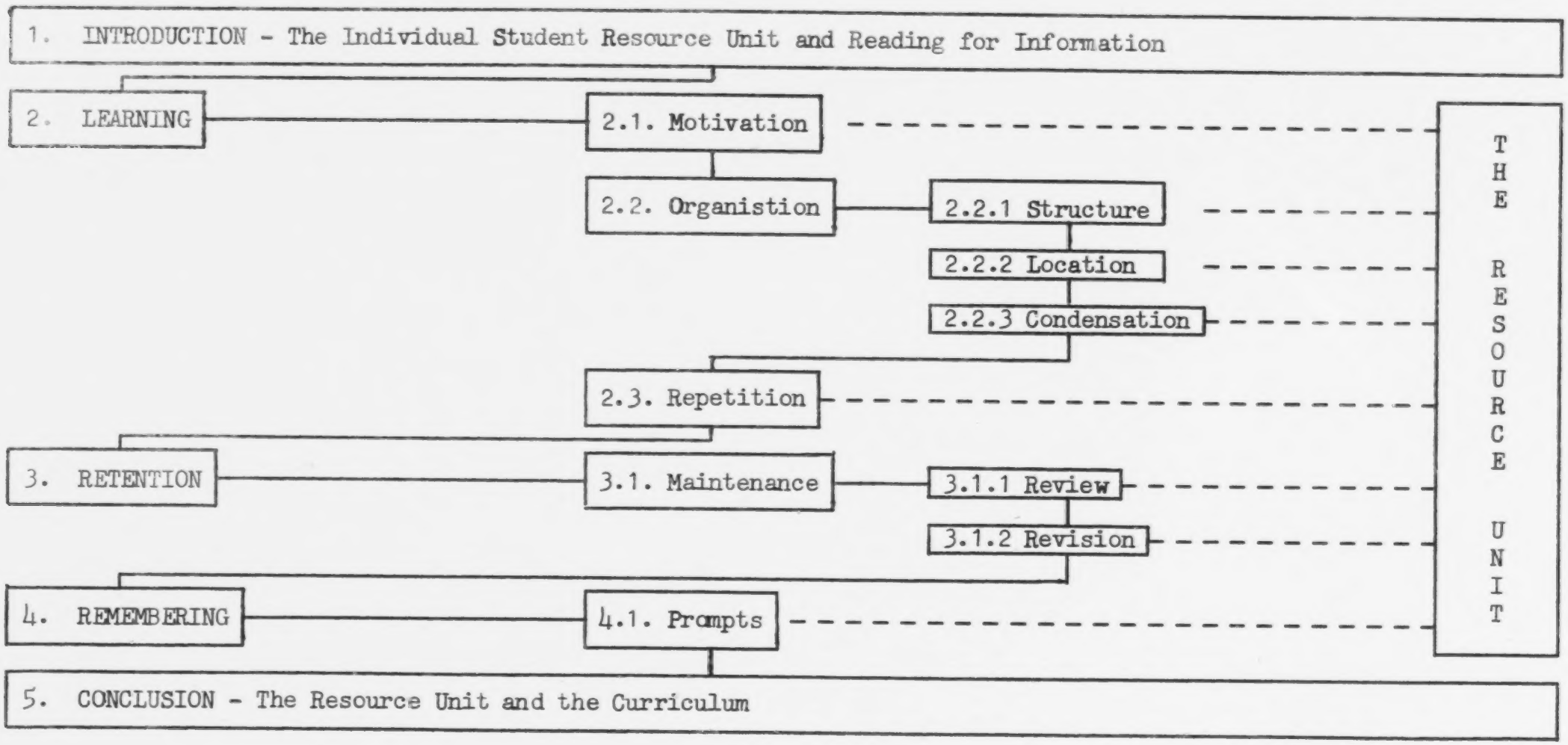
Ideally, in one sense, he should explore in his initial learning, an array of prompts of the kind to which he may later wish to respond. But life is ever-changing. Life would be dull if it did not. All the possible prompts cannot be predicted in advance. Has the resource unit therefore reached the limit of its contribution?

Not quite. In this ultimate test the resource unit must be seen as providing opportunities to achieve the best that we can possibly hope to achieve in preparing the student for unpredictable eventualities. It does so by causing him systematically to check his facts, to modify his ideas, to re-examine periodically his most basic frames of reference, to examine systematically the relationship between all of his ideas and his conceptual frameworks. In so doing it provides him with continuous opportunity to retain flexibility of mind. This at least gives him a better chance of responding to 'novel' situations at a later date by remembering relevant information.

5. Finally, let us leave our study of the resource unit as part of the process for reading for information. Let us turn instead to

the more general contribution of the resource unit to the curriculum. Here, we may simply recall that each time the storage and retrieval system is modified there is necessarily an investigation of a variety of new ways of classifying information. Some of these problems may be resolved by discussion or by meditation. Other problems generated in this way can only be resolved after further investigation. This may call for some sort of practical or empirical studies. It may, on the other hand, call for further reading. To this extent, then, the resource unit is a curriculum generator. From the point of view of reading it provides, continuously, yet another motive for reading to some purpose.

In conclusion we must remember, however, that like every other contribution to the development of competence in reading, any value the resource unit may have is limited absolutely by the quality of the teaching that goes into it.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